Idle Free Corridors: Northeast States Experience

EPA Region 2

Implementation Meeting

April 14, 2004

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NESCAUM

NESCAUM Background

- The Northeast States for Coordinated Air Use Management
- A nonprofit organization founded in 1967 to assist the New England states manage and develop air pollution policy and reduction programs.

Presentation Outline

- **Section I: Long Duration Idling and its Impact Upon the Northeast States**
  - Transportation and Idling Statistics, Air Quality, Public Health
- **Section II: Relevant Northeast States Project Experience**
  - New York State, New Jersey
- **Section III: Overview of NESCAUM Interstate 95 Corridor Analysis**
  - Interactive Mapping
  - Truck Stop Evaluation and Ranking

Section I: Transportation and Idling Statistics

- **Transportation to, from, within, and through I-95 Corridor States accounted for 37.5% of all shipments in U.S. in 1997, or $2.6 Trillion.**

- **Represents a total of 350 Billion ton-miles shipped, at an average distance of 142 miles per shipment.**

- **Over 2.75 Million light heavy and heavy trucks (Class 7 and 8) operating on US Interstate highway system.**

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. *National Transportation Statistics Annual Report.* October, 2003.

Transportation and Idling Statistics (continued)

- **The ATA's TMC (Technology Maintenance Council) estimates that one additional hour of idling per vehicle per day results in:**

  - Equivalent of 64,000 miles in engine wear and tear annually.
  - 500 gallons of wasted fuel.
  - $0.07 per hour in *Increased* maintenance.
  - $0.70 per hour in *Decreased* time to engine Overhaul.

Transportation and Idling Statistics (continued)

- **A Class 8, long haul driver will typically idle for up to 10 consecutive hours , on average, during extended layover periods while:**
  - Awaiting Dispatch
  - Loading or Unloading
  - Fulfilling Federal HOS requirements

- **As an industry trucking wastes over 900 Million gallons of diesel annually, according to the US. Department of Energy.**

Transportation and Idling Statistics (continued)

- **Class 7 and 8 vehicles have a life expectancy of over 25 years, on average, nationwide. Long haul rigs, by contrast, typically undergo a major engine overhaul or replacement at the 500,000 mile mark.**

- **Northeast States typically have a shortage of available parking spaces with slower annual parking demand growth (< 1.5%), whereas the Southeast States (NC, SC, GA, FL) enjoy a surplus but show very high annual demand growth (>3.5%).**

Corridor Snapshot: State of Virginia

- **A January, 2003 research report by U.S. DOT Center for Transportation studies found:**

  "Along I-95, the maximum demand for parking exceeded the number of available parking spaces at most truck stops by 10 to 20 percent. On average, the maximum demand at rest areas along I-95 exceeded the number of available parking spaces by about 27%."

Source: **University of Virginia – Center for Transportation Studies**. *Estimation of the Demand for Commercial Truck Parking on Interstate Highways in Virginia*. January 2003. Research Report No. UVA-CTS-5-14-65.

Transportation and Idling Statistics (final)

- **In the Northeast, higher prevalence of long duration idling due to:**
  - High traffic volume / Corridor congestion.
  - Unexpected Delays or Downtime (HOS violations).
  - Seasonal weather conditions.
- **Increased likelihood of collateral impacts to human and natural environment due to:**
  - Dense regional population.
  - High demand for parking spaces.
  - Age of TS facilities & proximity to communities.
  - Inadequate supply and illegal truck parking.

Section I: Regional Air Quality

- **In 2001, transportation vehicles and vessels accounted for the following percent annual contribution to the nation's pollution levels :**
  - 66% of carbon monoxide (CO)
  - 47% of nitrogen oxides (NOx)
  - 35% of Volatile organic compounds (VOC)
  - 5% of particulate (PM)
  - 4% of sulfur dioxide (SO2)
  - 6% of ammonia

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. 2001.

Regional Air Quality (continued)

- From a Northeast States perspective, engine out exhaust emissions from Class 8 heavy duty diesel vehicles adversely impact regional air quality.

- Contribution of PM and NOx from mobile sources introduces additional stresses to non-attainment and/or designation areas already experiencing or forecasting exceedances.

- In large urban centers, such as New York, mobile source emissions account for 85 to 90 percent of total pollution load present in ambient air.

Regional Air Quality (continued)

- **EPA, in January 2004 guidance, determined NOx and PM emission factors of 135 g/hr and 3.68 g/hr, respectively, for vehicles within state's mobile source inventory.**

- **In the Northeast, then, opportunity to apply diesel emission reductions within state implementation planning and transportation conformity process.**

- **Further, commercial viability of TSE as idling free solution for diesel trucks strengthens anti-idling policy measures and softens the blow of future compliance and enforcement actions by presenting a real alternative in compromising situations (temperature < 20 deg).**

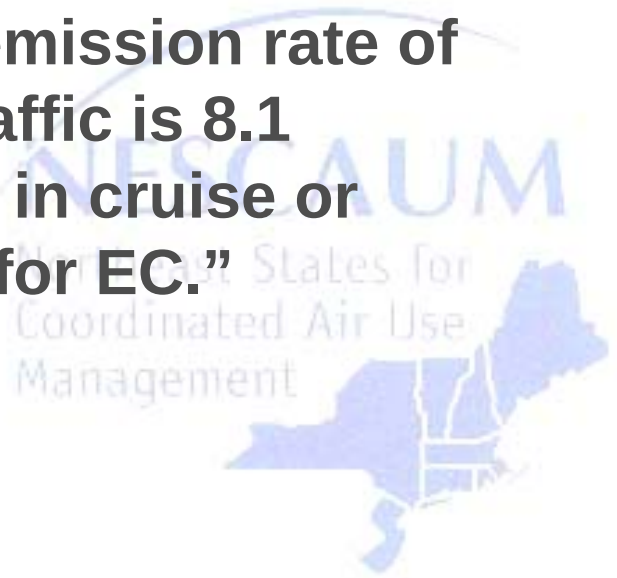
Corridor Snapshot: Summary of Member state idling regulations

	Yes	None
3 Minutes		ME
	CT	RI
	NYC	VT
	NJ	
5 Minutes		
	NH	
	MA	
	MD	
	NY state	

Section I: Public Health Perspective

- **Characterizing the health effects of diesel emission exposure is important for diesel risk reduction program development and better understanding of human health risks.**

- **New CARB finding that "per mile emission rate of OC from a HHDDT in congested traffic is 8.1 times higher than that of a HHDDT in cruise or transit mode and 1.9 times higher for EC."**



Public Health Perspective (continued)

- **Is this Significant? Perhaps. Why?**
  - **Traditional exposure assessment/cancer risk models assume that the OC/EC ratio is identical in traffic or in driving.**
  - **Therefore, if OC dominates carcinogenic and toxic effects of PM, human health risk increases 1x order of magnitude under traffic conditions.**
  - **From policy perspective, may influence regulation writing, locating of truck stops, traffic planning.**

Source: Norbeck et al. *Emission Rates of Particulate Matter and Elemental and Organic Carbon from In-Use Diesel Engines.* Environmental Science and Technology. 2004,7,2182-2189.

Section II: Relevant State Experience

Hunts Point Cooperative Market - Bronx, NY

DeWitt and Chittenango Service Plazas, New York State Thruway - Syracuse, NY

Travel Centers of America (TA) Paulsboro, NJ

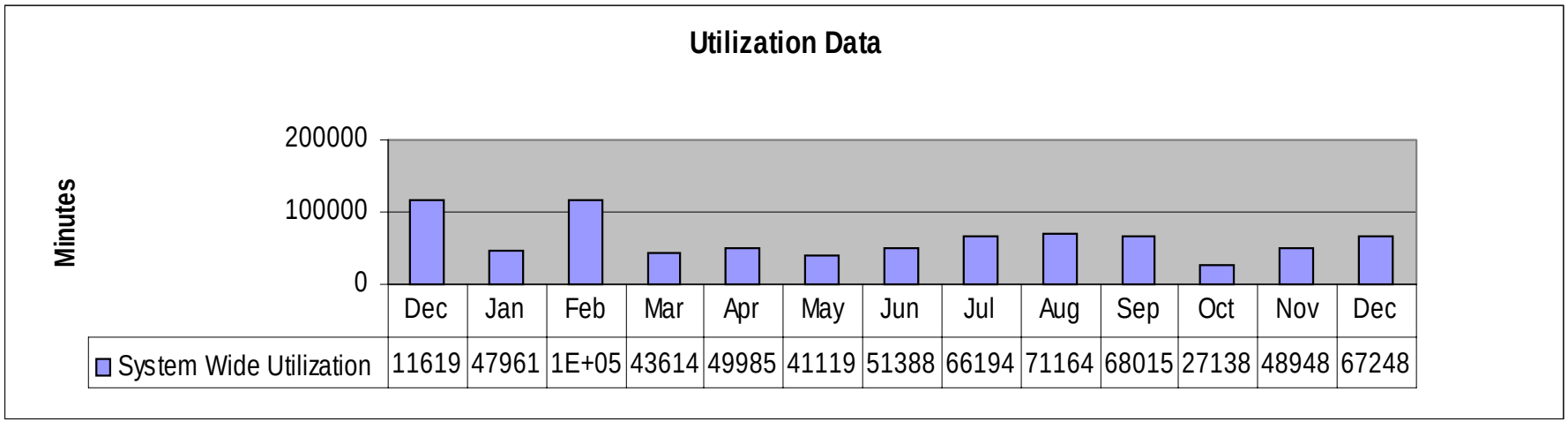
Hunts Point Cooperative Market

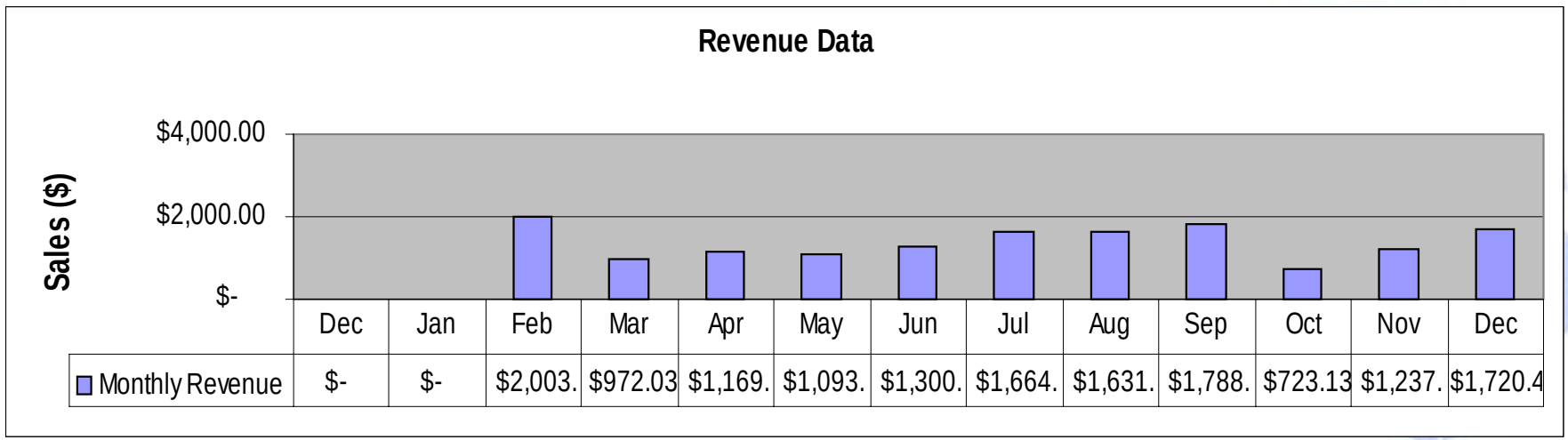
- 28 Bay advanced truck stop electrification (ATE) facility at commercial facility.
- Co-funded by Clean Air Communities, IdleAire, and the New York Power Authority (~ $500,000 total).
- Installed, maintained, staffed and operated by IdleAire Technologies.
- System activated in November, 2002

Hunts Point (continued)

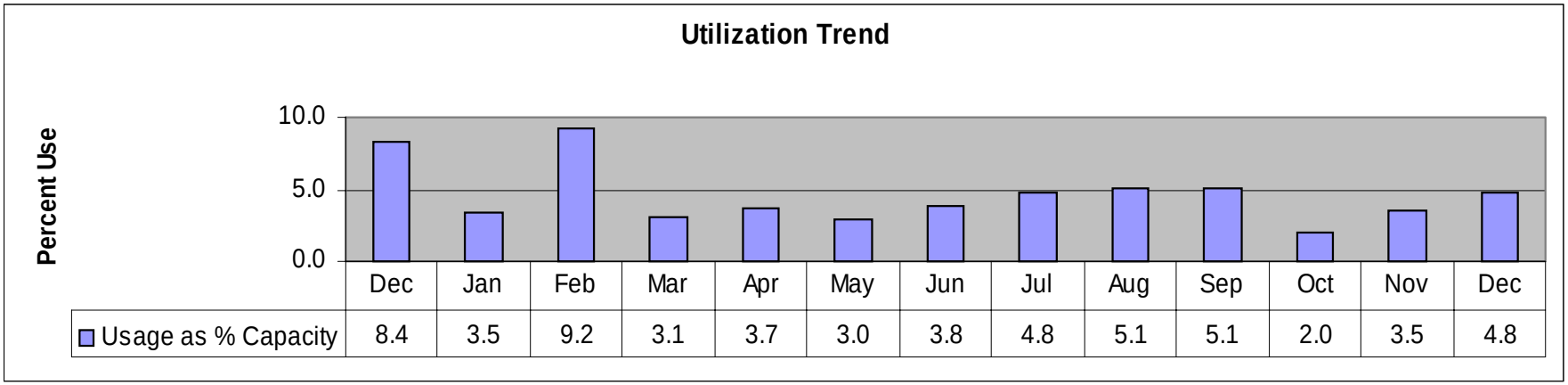
- **Positives**
  - No operational problems
  - Employs Bronx residents
  - Real emissions reductions achieved
  - Driver acceptance strong
- **Negatives**
  - Low resident truck population within market confines
  - Gated operation with $25 entrance fee to outside trucks
  - Closed on weekends
  - No driver amenities or services

Hunts Point Data Analysis (1)

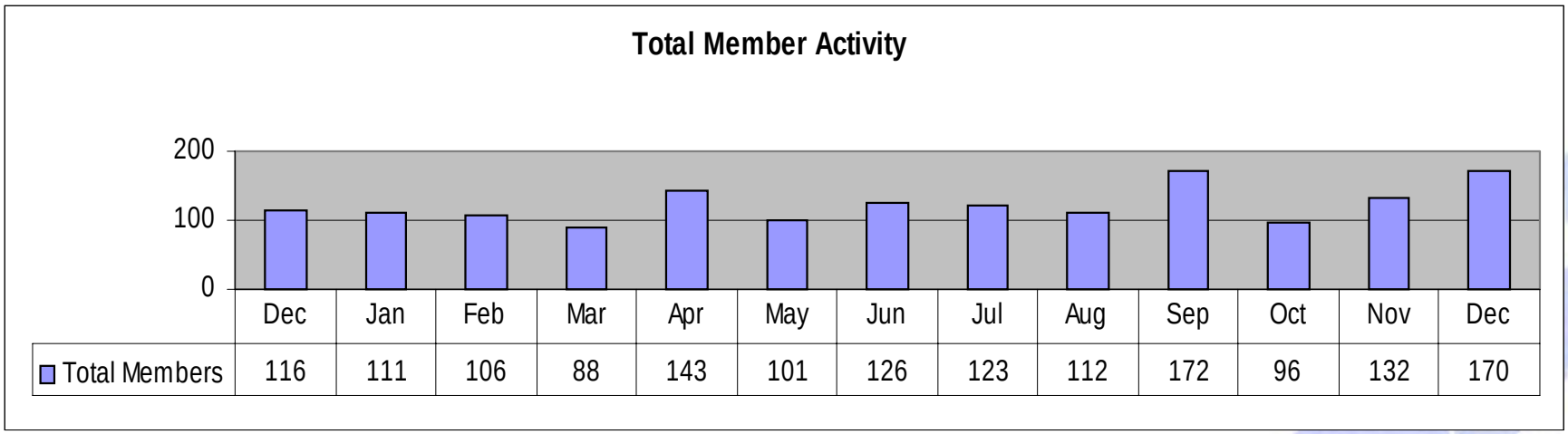




Hunts Point Data Analysis (2)

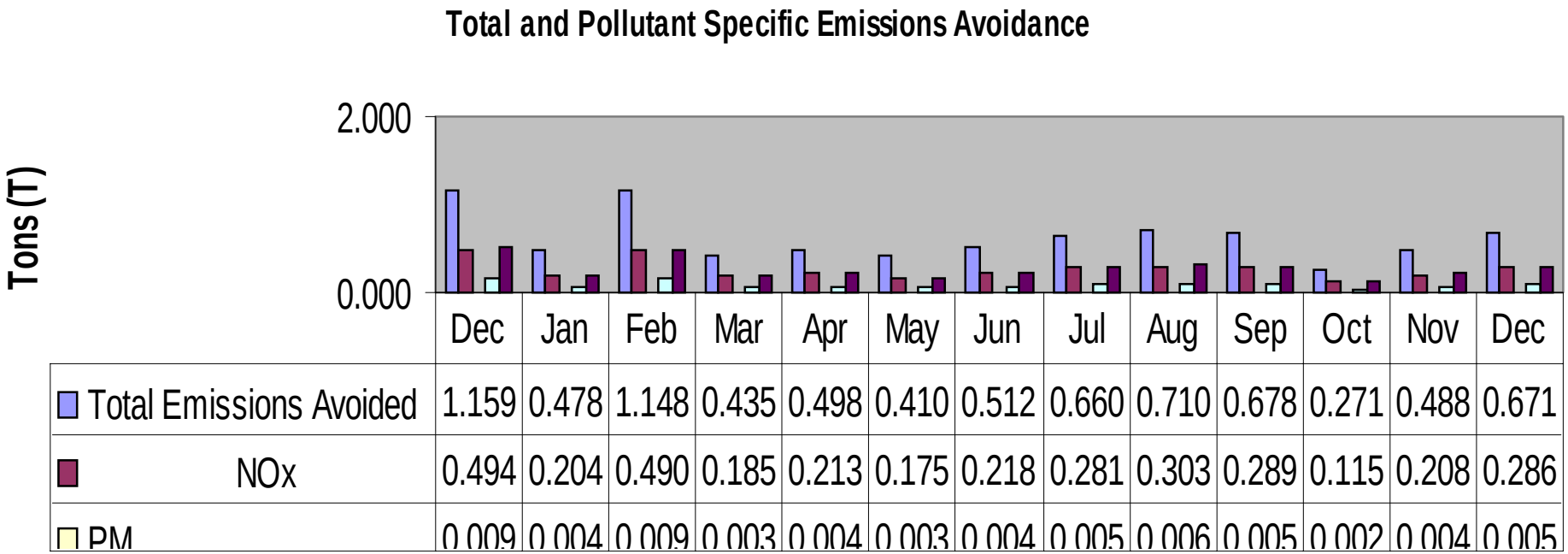


	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Usage as % Capacity	8.4	3.5	9.2	3.1	3.7	3.0	3.8	4.8	5.1	5.1	2.0	3.5	4.8



	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Members	116	111	106	88	143	101	126	123	112	172	96	132	170

Hunts Point Data Analysis (3)



	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Emissions Avoided	1.159	0.478	1.148	0.435	0.498	0.410	0.512	0.660	0.710	0.678	0.271	0.488	0.671
NOx	0.494	0.204	0.490	0.185	0.213	0.175	0.218	0.281	0.303	0.289	0.115	0.208	0.286
PM	0.009	0.004	0.009	0.003	0.004	0.003	0.004	0.005	0.006	0.005	0.002	0.004	0.005

NYSTA - Syracuse, NY

- **NESCAUM case study of two TSE locations along I-90 East/West in greater Syracuse, NY area.**

- **Designed study to characterize spatial and temporal variability of mobile source aerosol using Aethalometers to measure black carbon soot concentrations (light absorption through a quartz filter).**

- **Truck stop 'signature' not statistically significant from background, a state park maintenance facility. Background did experience episodic spikes during wood smoke season and lawn mover maintenance.**

Syracuse (continued)

- **Antares Group sub-contracted to manage field work, data analysis component for NESCAUM.**

- **Issued driver marketing survey to 212 drivers between July 2002 and January 2003.**
  - 192 of 197 respondents would use system again.
  - 138 drivers recorded layovers between 8 and 10 hours.
  - Most drivers indicated they idled in the 600-1000 rpm range.

Paulsboro, NJ

- **NJDEP consent order with NJ violator stipulating $1.0 M environmentally beneficial project (SEP) using TSE technology.**
- **100 truck parking space electrification. IdleAire, NESCAUM, and NJDEP partners. 2 phase installation starting in May, 2004.**
- **NESCAUM to study environmental, energy, economic, operator benefits of TSE, and develop web based software application to analyze system data. Coordinated education outreach effort.**
- **Sister project (75 spaces) in Bordentown, NJ.**

Section III: Overview of NESCUAM I-95 Corridor Analysis

- **Assembled NESCAUM Work Group in late 2002 to begin explore ways to expedite TSE implementation along I-95 corridor.**

- **Developed truck stop evaluation matrix in excel database format using existing environmental, demographic, and economic data to identify, analyze, and rank truck stop locations according to a set of prescribed selection criteria.**

I-95 Corridor Analysis (continued)

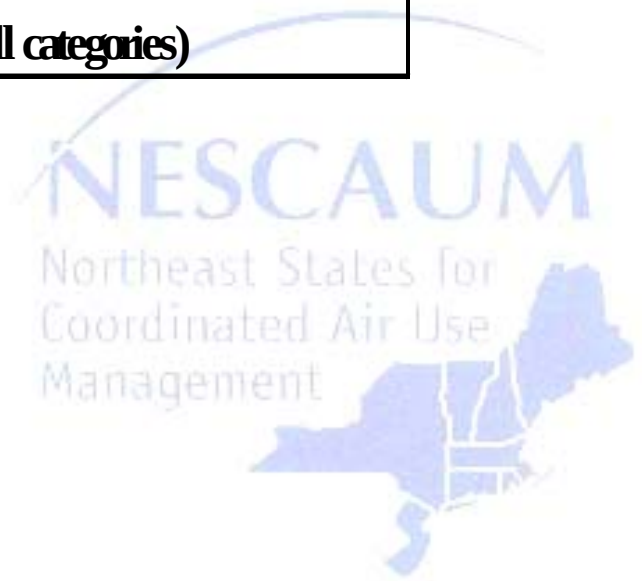
Selection criteria:

1. Site density
2. Usage
3. Growth
4. Critical Mass
5. Public Health Index
6. Regulatory Impetus

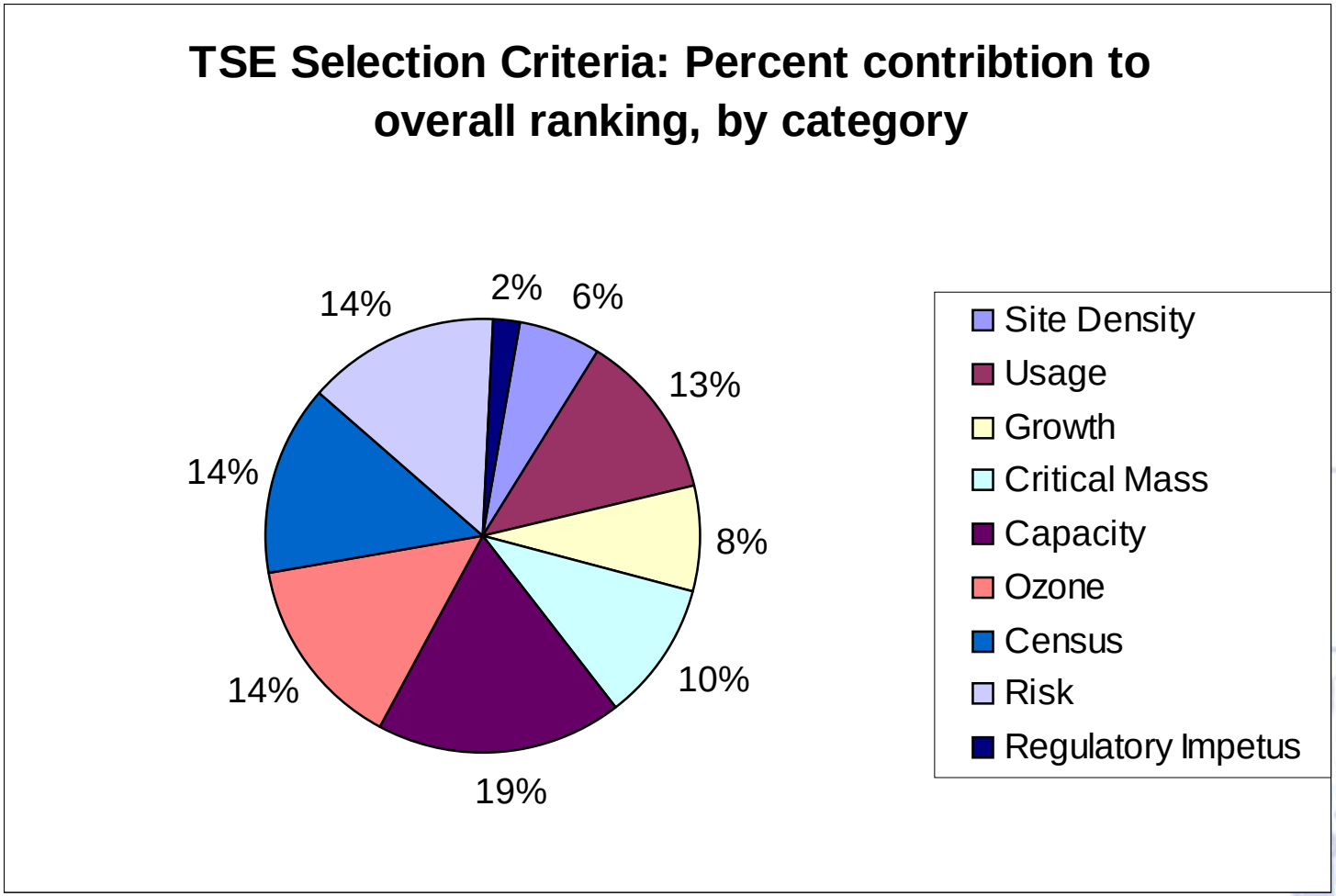
Criteria Weighting Factors / Sensitivity

Criteria Name	Scoring Range Min	Max	%Total
Site Density	1	3	6.13%
Usage	0.63	6.16	12.58%
Growth	0.5	3.8	7.76%
Critical Mass	0	5	10.21%
Capacity	0	9	18.38%
Ozone	1	7	14.30%
Census	1	7	14.30%
Risk	1	7	14.30%
Regulatory Impetus	0	1	2.04%

Maximum Achievable Score = (? all categories)	48.96



Criteria Contribution to Overall Truck Stop Ranking



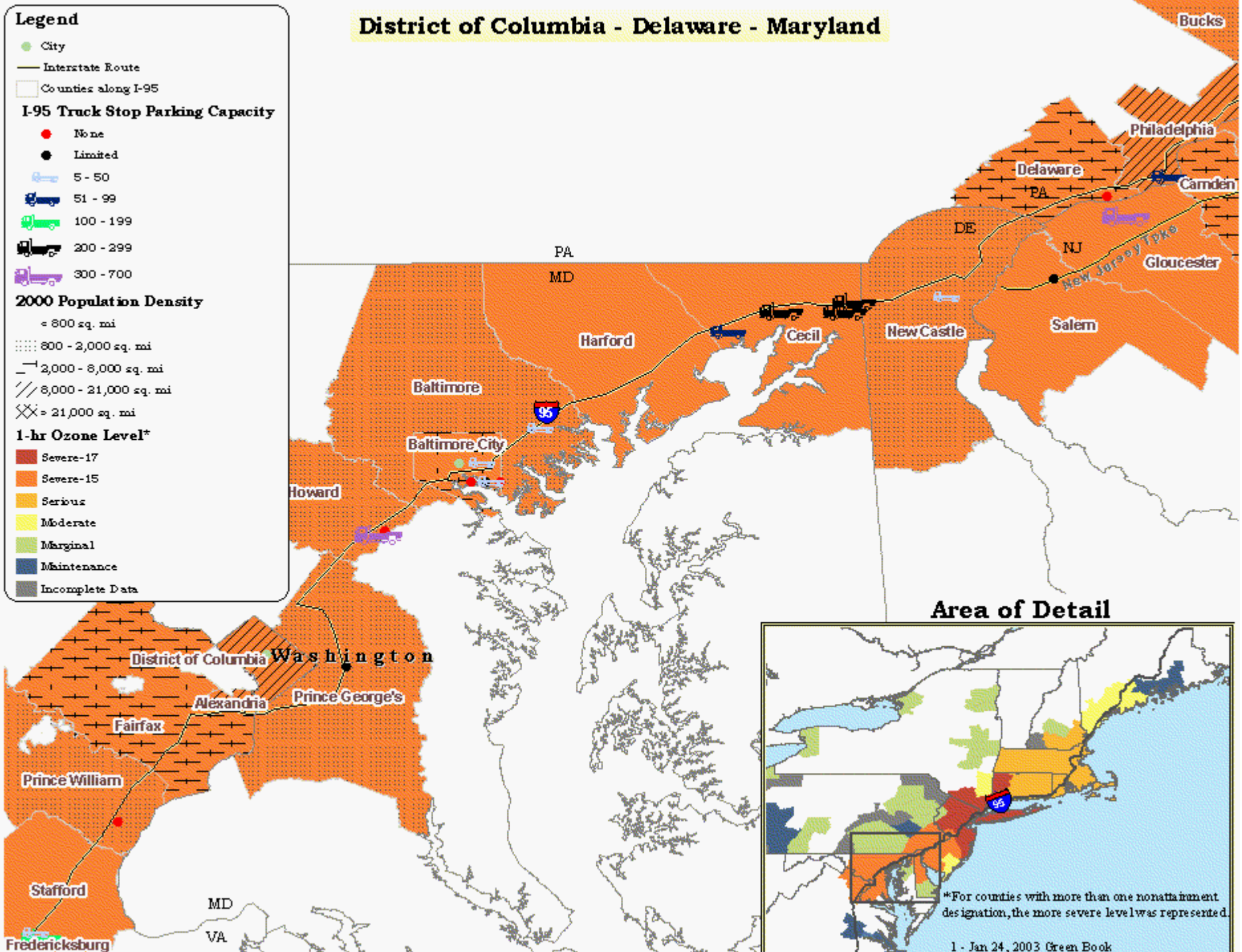
Corridor Analysis (continued)

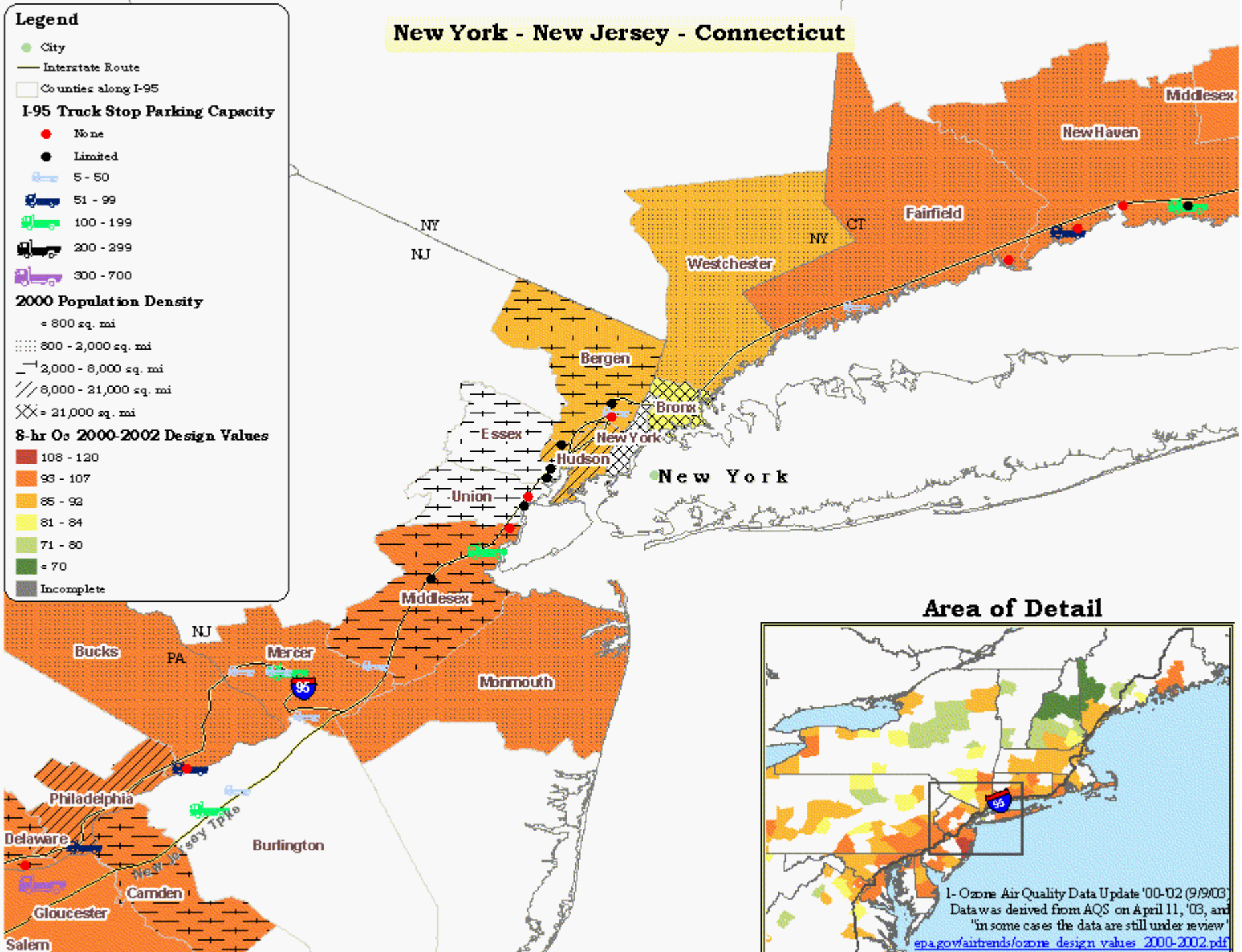
- The evaluation matrix allows the user to sort any of the criteria specific or ranking and ordering categories (such as Parking capacity, or State rank).

Corridor Analysis (Part II)

- **Developed a series of web-based interactive maps that plot each truck stop location with background ozone attainment levels, population density figures, and county utility provider information.**
- **Truck stop specific evaluation and ranking data is accessible by mouse activating any of the truck stop symbols on the map series.**
- **The map series and evaluation matrix database (password protected version) is downloadable at the NESCAUM web-site.**

District of Columbia - Delaware - Maryland




New York - New Jersey - Connecticut
Legend
City
Interstate Route
Counties along I-95
I-95 Truck Stop Parking Capacity
None
Limited
5 - 50
51 - 99
100 - 199
200 - 299
300 - 700
2000 Population Density
< 800 sq. mi
800 - 2,000 sq. mi
2,000 - 8,000 sq. mi
8,000 - 21,000 sq. mi
> 21,000 sq. mi
8-hr O3 2000-2002 Design Values
108 - 120
93 - 107
85 - 92
81 - 84
71 - 80
< 70
Incomplete
NY
NJ
CT
Middlesex
New Haven
Fairfield
Westchester
Bergen
Bronx
New York
Essex
Hudson
Union
New York
Middlesex
Monmouth
Bucks
PA
Mercer
95
Philadelphia
Delaware
New Jersey Tpke
Burlington
Camden
Gloucester
Salem
Area of Detail
1- Ozone Air Quality Data Update '00-'02 (9/9/03)
Data was derived from AQS on April 11, '03, and
"in some cases the data are still under review"
epa.gov/airtrends/ozone_design_values_2000-2002.pdf

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